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SCIENCE.

FRIDAY, AUGUST 3, 1883.

THE U. S. NATIONAL MUSEUM.

II.

IN a former number we reviewed some of the important principles of general classification suggested by Mr. Goode's plan of the National museum. We resume the topic to discuss some of the salient points in the minor groupings of the same scheme.

Section iii., 'natural resources,' i.e., 'force and matter,' appears to be out of place. Certainly these are primary subjects; and we cannot, as a merely practical matter, understand why the study of physics and chemistry is placed after that of the earth, which is to be treated of earlier under the separate heads of 'cosmology,' 'geology,' 'physiography,' etc., in section ii. Imagine a person trying to learn something of the relations of force and matter to the history of the development of the earth and its topography as it now appears, and having in view the applications of these studies to the explanation of some of man's migrations or racial differences, or to any other anthropological problem which might reach back to primary connections. Is it supposable that his inquiries would be facilitated by placing the collection in such relations to each other as completely to cover up and invert their natural relations and logical order? Or is it probable that the mind of the visitor would be more enlightened by getting his information about the relations of the elements after he had passed through celestial and terrestrial physics and chemistry, and all the applications of these to the history of the development of the earth?

We can readily picture to ourselves the confusion which might be generated in his mind, and the discovery he might make of the necessity of reviewing all he had passed over before; but we fail in attempts to imagine the advantages of this inversion. We cannot, therefore, understand the considerations which induced

Mr. Goode to adopt this method of arranging the sections, nor why he did not place natural resources first, and man last, in his natural history division; for that is what the first three sections really constitute when taken together. They would then have stood in approximately natural, and certainly respectably logical, relations to each other.

We should then have had in section i., physics, chemistry, and all the mineralogical, botanical, and zoological collections as introductions to the study of section ii., where the principles of science learned in passing them in review would be found of essential assistance in understanding the earth, with all the topics of cosmology, geology, etc., whether presented, as Mr. Goode proposes, solely as man's abode, or in its more natural relation to the universe as a planetary body. The last seems to us the preferable because more natural mode of presentation; and the author shows this by bringing in cosmology. This, if at all effective, must show that the earth is a planet primarily uninhabitable by man, and evolved without reference to his existence, conducted in its career by cosmic forces uninfluenced by his presence, and, in all likelihood, destined to become unfit, in course of time, for his existence.

After the earth as man's abode had been passed through by the visitor, we could readily conceive of his being all the better prepared for the understanding of section iii., 'the natural history of man and his adjuncts of all kinds.'

Passing over section iv. ('the exploitative industries') and section v. ('the elaborative industries'), which together constitute what appears to be a second grand division of the museum representing the purely industrial side, we come to section vi. In this section are included foods, and drinks in their final stages of preparation for the use of man, narcotics, dress, buildings, furniture, heating and illumination, medicine, hygiene, transportation. All

of these are supposed to have a more direct relation to the physical condition of mankind, either from their nature, or in the peculiar stages of their manufacture which makes them admissible to the cases of this section.

Section vii., 'social relations of mankind (sociology and its accessories),' is to be an exposition of the appliances and methods made use of by man in his social relations, communication of ideas and their record, trade and commerce, societies and federations, government and law, war, ceremonies.

Section viii., 'intellectual occupations of mankind (art, science, and philosophy),' is to show the existing intellectual and moral condition of man, and the most perfect results of human achievement in every direction of activity. Its topics are to be games and amusements, music, the drama, the arts, literature, folk-lore, science, philosophy, education, and climaxes of human achievement.

The sixth to the eighth sections contain the special topics which can be used to illustrate the results of the intellectual progress of man more completely and directly, perhaps, than the industries, in sections iv. and v.; and these are accordingly placed in a succession leading naturally to their culmination in the topic which terminates section viii., and is at the same time the sixty-fourth and last of all of the topics. This terminal topic is to be an exposition of the most remarkable achievements of man. The separation of this from the final topic of section i. ('man in his individual manifestations, representative men, biography') shows, that, though Mr. Goode has kept in view the keynote of man's progress in civilization, the development of the individual, he has nevertheless either failed in seeing, or considered of subordinate importance, the racial peculiarities and advantages of which the representative man is necessarily only the concentrated or focalized expression.

In fact, this want of what we might call psychological insight is apparent everywhere; and throughout the scheme the race is subordinated to the notion that man should be presented and considered as a whole, whether in

the development of the topics separately, or the purely comparative arrangement of the sixty-four topics themselves as assembled in the different sections of the museum. In section i. man is treated of 'psychologically as a unit;' and it is only in the second topic of this section, where the natural relations of men force the treatment to stand upon a racial basis, that we find this policy even apparently abandoned. We say apparently; because, as we understand it, the effort here will be not to show the historical or physical development of the races, so much as to contrast them side by side and exhibit the characteristics of each race.

In all its parts, the arrangement is based in each topic upon a comparison of the work of different races; and the objects used for these purposes must be withdrawn from their natural associations in other collections, and their significance in the history, physical and psychological, of any particular race, be sacrificed.

This is the method of comparative anatomy, and has certain obvious advantages for the study of anatomy if it is confined in application within the well-defined limits of any one type of plants or animals; but it is liable to lead to serious errors when carried beyond these limits. The dismembered organs or parts, though similar, are, when found in distinct types, unquestionably often distinct in origin. The comparative method necessarily cuts across the natural order of things in their relations to time and to the successive stages of their development; and this is an obvious defect, which, when applied to anthropological collections, is destructive of all natural conceptions as to the way in which modifications and changes really arise or flow out of pre-existing localized or racial conditions.

Anthropology as a science is essentially concerned in tracing the history of different races of men: it clings to the race as the safest basis of classification at present existing, and it is the test by which all general conclusions with regard to the nature of man and the evolution of civilization are judged. A museum of anthropology departs widely from this basis

and true scientific conservatism when it assumes the task of harmonizing the psychology of all the races of men, especially in the present almost unexplored condition of this field in savage races, and when it declares that it can present a true picture of the existing condition of man by the method of general comparison of things whose connections, as they stand side by side, are obviously unnatural.

The presentation of the results of achievement in all directions, as attained by each race or natural association of races, could not have been open to such serious objections, would have been far more effectual, and more in accordance with the principles of modern classification and the practice of museums of anthropology. It would, at any rate, have retained the collections in what are known to be their natural relations; such a presentation could not have failed, therefore, to meet the wants of the future and the demands of the present in a more effectual way than by any artificial classification, whatever its convenience.

We do not think that the industrial side would have suffered from this policy, but, on the contrary, we think its subjects would have greatly gained in interest from being shown as developed by the different races; nor do we believe that such a plan would have demanded more room than the present plan, required any more duplicate collections for its proper illustration, or yet have greatly increased the difficulties of the classification of topics which Mr. Goode has so ably handled in his scheme.

The comparative method could then, if deemed necessary, have been resorted to as a crowning effort to show, side by side in a single collection, the ultimate achievements and results attained by each race, how far it had been able to advance in civilization, and what influence, if any, its finest work had had upon the existing conditions of that civilization. Such a summary certainly could be so limited by judicious selection as to be brought within the mental grasp of the intelligent and diligent student; whereas a definite conception of Mr. Goode's sixty-four topics presup-

poses mental powers of a titanic order. In fact, the graphic picture of civilization which they will present will, from their number and mode of arrangement, be necessarily heterogeneous,—an improvement, no doubt, on general notions in being composed of objects instead of individualized mental conceptions, but certainly not capable of giving the harmonious effect which the author aims at producing.

The National museum is, however, to be not only the representative educational museum of this country, but is also to be combined with departments of research. We have, therefore, to consider the probable influence of the museum of education and its collections upon the departments of research, bequeathed to its care by the Smithsonian, as well as those likely to come under its influence in the future. These last collections might, perhaps, be safely left to themselves; but it must be remembered, that, though at present secure, they will eventually obey the law of attraction, and their curators must begin immediately to take an active interest in the collections which are to represent their achievements before the country at large, and the relations of these departments to the prospects of investigators.

At present the departments of research and those of education are not only under one head, but the subordinate offices are also united in the same persons. Under these circumstances, we view with apprehension certain tendencies, which are evident in the pamphlet before us, and especially the prominence given to the industrial sections. Their present mode of arrangement and ideals do not definitively shut out all possibility of co-operation with business; on the contrary, if we understand certain passages in Mr. Goode's pamphlet, this co-operation is invited, and some firms are already providing the cases with collections of industrial products. We know that science is not the weakest now in the National museum, and our fears will probably highly amuse the officers of the industrial sections; but nevertheless, we cannot see what is to prevent enterprising firms from presently finding out the value of these departments as advertising mediums, and being

aggressively if not successfully generous in supplying their wants with expensive gifts, accompanied by their business-cards. The fertility of the imagination in the construction of wedges may certainly be counted upon as quite equal to the opening of any cracks which may present themselves; and we think it would have been far more prudent to recognize and provide for these dangers, however remote they might be considered.

We are, of course, conscious that the joining of hands between science and the industries is the general drift of the tendencies of the day, especially in this country. That this will elevate the industries, we have no doubt; but that it will also elevate the ideals of science, we do not believe. How will the future director, however scientific, avoid the necessity of becoming, before the government and the country, the representative of great commercial and industrial questions and interests, and be in danger of having his interests and his thoughts drawn into the vortex of such affairs, to the exclusion and neglect of the purely scientific aims and objects of the museum? We do not claim that this will be sure to be the case, but simply that we do not see how he can avoid the natural results of his position at the head of the great industrial museum of the country.

Mr. Goode's pamphlet also contains other matters, which, when viewed in the light given by the past history of other museums, show the neglect of essential precautions. There is, for example, no provision for limiting the accumulations of specimens. On the contrary, overpowered by the wants of his world-embracing scheme, he appeals to public-spirited citizens to come forward and deposit their valuable and extensive private collections; and it is especially recommended that the officers, by a wise forethought, should encourage this propensity to the utmost.

Private collections have been made for the most heterogeneous purposes; and it is well known that their possessors usually demand, in return for their generosity in giving them, that they shall be kept together, or have a goodly

proportion of exhibition space allotted to them. Such unqualified appeals, and the neglect of all other precautions¹ against the unlimited acquisition of materials, are entirely at variance with the selective policy previously announced, and a complete surrender of the principles which should govern a museum starting with a new ideal, and bent upon avoiding the errors of policy and the unnecessary burdens which had been previously and truthfully described by Mr. Goode as the greatest obstacles in the path of the older museums.

It does not require a prophetic eye to see in the near future, that assisted by the Fish-commission, the Geological survey, and other departments of the government, the business energy and liberality of the American citizen, the pride, energy, and influence of the present staff of museum, uncontrolled by any prudential considerations, and stimulated by the universal field they are required to cover, will heap up materials not only faster than they can be handled, but in such masses that they will become, as in older museums, serious obstacles to the progress of the museum of education itself, and be still more serious in their effects upon the museum of research. The resources of the National museum, however great they may be, will inevitably find themselves, sooner or later, blocked by these accumulations; and their care will occupy the time of the officers in an increasing ratio. Luckily for science, men in such positions have frequently found themselves unable to resist the suggestive seductions of research, and allowed collections to suffer while they studied; but many, too conscientious to do this, have been sacrificed to the mere preservation of materials, whose labors would have repaid the daily wages of many more lower-class laborers to any civilized government. Large accumulations, however, not only directly discourage the investigator by

¹ That we are not misrepresenting the spirit of the museum by this remark may be learned in Mr. Goode's own words: "The classification proposed should provide a place for every object in existence which it is possible to describe, or which may be designated by a name. When the object itself cannot be obtained, its place should be supplied by a model, picture, or diagram."

wasting his time, but their necessary preservation strikes at a still more vital point in using up funds which could otherwise be employed for the publication of the results of researches. They also equally interfere with the purchase of delicate instruments, the employment of labor to directly assist in carrying out the purposes of research, prevent the purchase of such specimens or collections as may be essential, and cut off opportunities for travel and study in other museums or parts of the world.

We think, therefore, that, while the National museum may open some paths to the investigator, it will neither directly do the very best work in this direction, nor give us any grounds for believing that it will introduce a new era of prosperity for abstract investigation. It will add one more to the useful scientific institutions of its kind, it will undoubtedly contribute to the progress of science by increasing the opportunities for employment and by the example of its officers; but it will not do much for them or for us in the way of an exalted ideal.

If the museum of education had been limited by a wise policy of selection in its accumulations of materials, and placed under a distinct staff, we could have made no such objections; then the practical objects of its existence would not have suffered, as they now surely will, from the psychological tendencies of the investigating curators; nor, on the other hand, would the investigators themselves have been distracted by having a double purpose in all that they were doing, and frequently obliged to sacrifice one or the other. We do not wish to imply that the museums should not be under one general head, and have all the benefits of mutual association, but simply insist that the ideals are quite distinct, and the officers should realize this by being under different regulations, and under a different government, in each of the two museums. The investigator cannot avoid placing on exhibition the record of his own and others' work; and he will find a thousand good reasons for crowding the cases with fine collections, because they are fine, and because they are important in

research, or unique, or remarkable; and the educational idea will be subordinate or completely lost in such parts of the museum, so far as the average student is concerned.

The cost of the museum will be enormous; but if its lessons can be easily mastered by the average student, and in this case the student is the average congressman, he will not begrudge the funds which are necessary for its support. It must be remembered that these are keen men, quick to see the advantages of such lessons as the museum can teach them; especially if, like the library, it can make itself really useful to them, and keep up with the times by illustrating the new results of discovery and research in all departments of learning in an explanatory and popular way. We imagine that they will not be slow in calling upon the officers of the museum whenever they have need of their services, and that they will be rather disgusted if any of the requirements of research interfere with their desire for information.

While we wish the greatest success to the National museum and its energetic and deservedly popular director, and have the highest respect and friendliest feeling towards their undertaking, and a faith that they will finally work out a better result than is promised, we think that neither this faith nor their great scientific achievements, of which we are justly proud, nor the liberality of the government, can entirely make up for the absence of the public recognition of a more purely scientific ideal in *our* National museum.

*KINETIC CONSIDERATIONS AS TO THE
NATURE OF THE ATOMIC MOTIONS
WHICH PROBABLY ORIGINATE RA-
DIATIONS.*¹—II.

HAVING now sufficiently cleared the field of inquiry by this preliminary discussion, let us consider the proposed hypothesis somewhat more closely, both as to what it is precisely, and as to how far it is in accordance with the phenomena. The whole outcome of Lockyer's investigations, to which we have referred, leads to the conclusion that atoms of the chemical elements are complex bodies, all of which

¹ Concluded from No. 24. See also *Proc. Ohio mech. inst.*, ii. 89.